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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/033,451	12/27/2001	Mika Kahola	460-010813-US(PAR)	9268

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EXAMINER	
ZHU, JERRY	

ART UNIT	PAPER NUMBER
2121	

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/033,451	KAHOLA, MIKA	
	Examiner	Art Unit	
	Jerry Zhu	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 20002875, filed on December 28, 2000.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claims 1-16 are rejected under 35 U. S. C. 103 as being obvious over Agrawal et, al. U.S. Patent. No. 6072990 (Agrawal) in view of Lewis, U.S. Patent No. 5687290 (Lewis). Specifically:

Claims 1

1. Agrawal discloses a method for performing link adaptation in a communication system where two communication devices communicate by exchanging packet data (col.1, lin.53-54) in wireless environment. (Fig.1, Abstract, lin.1-3. Determine the operating point is performing link adaptation) The method determines packet error

rate (Abstract, lin.3-5, word error rate and packet error rate are equivalent.), selects modulation mode from at least two, (col.5, lin.65-67; col.6, lin.1-2, encoding schemes include modulation modes)

Agrawal fails to teach the selection of operating parameters such as power level and modulation modes using fuzzy logic that treats packet error rate as one of fuzzy state variables and power level and modulation modes as fuzzy control variables. (col.5, lin.65-67; col.6, lin.1-8)

Lewis teaches a method using fuzzy control that takes inputs, process inputs using certain fuzzy rules and provide fuzzy output data representative of control actions in communication network environment. (col.3, lin.24-34)

Motivation: All communication networks require monitoring and control of network operation which artificial intelligence, such as Rule-Based-Reasoning, maybe used. If the network operates under unpredictable or rapidly changing domains, two problems arise. The first problem is that the RBR system fails when the system is presented with a novel problem for which it has no applicable rules. Another problem is that lack of flexibility of "crisp logic" where only two values, "true" and "false" are allowed.(col.3, lin.19-67; col.2, lin.1-29) Lewis provides a more flexible approach than what Agrawal has used. (col.3, lin.9-12)

One of ordinary skill in the art would have provided the fuzzy control taught by Lewis for the purpose of determining operating parameters such as power level and modulation mode from measuring input data such as packet error rate using fuzzy control logic taught by Lewis. As a result it would have been obvious to one of ordinary skill in the art at the time of applicants' invention to modify the system taught by Agrawal by adding the fuzzy control logic as taught by Lewis.

Claims 2

2. In the method taught by Agrawal as claim 1, a target value is determined to the packet error rate aimed to be kept substantially the same as the target value, and the difference between the packet error rate and target value is used as control variable in the method. (col.4, lin.30-45, acceptable word error range implies that there is a target value and the difference between the actual error rate and the target value, defined as error range, is acceptable.)

Claims 3

3. The method of claim 1 as taught by Agrawal, measures packet error rate (abstract, lin.4-12) and change of packet error rate (col.9, lin.5-7) for inputs of the method. The modified Agrawal's method by adding Lewis's fuzzy control logic takes packet error rate and the change of packet error rate as inputs represented as fuzzy control values, and a set of fuzzy rules is arranged, which are used for determining the effects of the control values to the modulation mode used as a controllable value.

(abstract, lin.1-14; Agrawal measures packet error rate and the change of packet error rate as inputs to Lewis' fuzzy inference engine that produces control outputs such as power level and modulation modes as taught by Agrawal.)

Claims 9-11

4. In the method of claim 1, Agrawal teaches a transmitter that encodes transmitted data from encoding schemes that includes modulation modes. The operating point of transmitter is defined by power code that anticipates transmission power. The selected modulation modes and transmission power will produce desired packet error rate. (col.5, lin.65-67; col.6, lin.1-22. The encoding schemes are implemented using Lewis's fuzzy logic as taught in claim 1.)

Claims 4-6

5. Applicant's algorithm as set forth in claims 4-6 has been considered and is given little patentable weight. The algorithm is commonly taught in texts such as Kosko ("Neural Network and Fuzzy Systems and Dynamical Systems Approach to Machine Intelligence" page 306-322) and widely used such as Shen ("New Mobility Profile Prediction: An Adaptive Fuzzy Inference Approach" page 370), therefore it is merely a matter of engineering choice in design and not considered to provide any new or unexpected result.

Furthermore, one of ordinary skill in the art would have provided the algorithm, as a design choice taught by Kosko, for the purpose of implementing the fuzzy inference engine for the fuzzy logic taught by Lewis. As a result it would have been obvious to one of ordinary skill in the art at the time of applicants' invention further modify the system taught by Agrawal by choosing the algorithm taught by Kosko to implement the fuzzy inference engine taught by Lewis.

Claims 7

6. In the modified method of Lewis as defined in claims 3-6 in line with the method of claim 1 taught by Agrawal, the fuzzy control outputs include modulation modes, as in claim 1, each of which is defined as an individual index as in claim 6. The method of Lewis in view of Kosko has following steps:

An initiation phase, wherein one of said indexes is selected in order to select the modulation mode used in communication selection (It is inherent in the algorithm taught by Kosko that indexes are chosen to be able to use the algorithm in claim 5. In the context of claim 1 and 5, the indexes represent outputs that include modulation mode);

a computing phase, in which the difference of the packet error rate from the target value(Agrawal, col.4, lin.36), and the change rate of packet error rate are calculated; (Agrawal, col.9, lin.5, to response the change of error rate must be calculated.)

a fuzzy control phase, in which fuzzy control is used for defining the index change of the modulation mode and the modulation mode is selected according to the calculated new index. (It is inherent in the algorithm taught by Kosko that the fuzzy logic algorithm calculates the new index that represents fuzzy outputs that include modulation mode);

Claims 8

7. In the method of claim 7, the calculating phase and fuzzy control phase are repeated. (Agrawal, col.6, lin.17-22, Lewis's fuzzy control logic and Kosko's algorithm are used in the context of Agrawal, therefore the calculating phase and fuzzy control phase are repeated.)

Claim 12-14

8. Claims 12-14 are systems claims that correspond to method claims 1-3 respectively. Therefore claims 12-14 are rejected under the same rationale as cited in the rejection of rejected claims 1-3 respectively.

Claim 15

9. Agrawal teaches a system for transmitter and receiver pair in wireless communication network as discussed in claim 1. Even though Agrawal does not mention explicitly an access point controller in the system, Agrawal does not limit the number of transmitter-receiver pairs and the type of communication terminals. (col.5, lin.60-64) Should the need of an access pointer controller arise in the system taught by Agrawal, it would have been obvious for an ordinary skill in the art at the time of the invention to modify one of terminals in the communication system taught by Agrawal into an access point controller as one type on communication terminal in the system taught by Agrawal. By treating an access pointer as a wireless terminal claim 15 is rejected in the same rationale as the rejection rejected in claim 16.

Claim 16

10. Agrawal teaches a wireless terminal (Fig. 1 the transmitter 12 or receiver 13), comprising means for transmitting packet information at least partly wirelessly in a communication system arranged between the wireless terminal and a second communication device (Fig. 1 is the communication system with two communication devices communicating wirelessly), means for defining packet error rate (col.1, lin.54-64), and means for selecting modulation modes (col.6, lin.1).

Agrawal fails to teach selecting modulation modes using fuzzy control. Lewis teaches means for using fuzzy control for selecting modulation mode and at least packet error rate being used as one fuzzy variable as in claim 1. It would have been

obvious to one of ordinary skill in the art at the time of applicants' invention to modify the system taught by Agrawal by adding the fuzzy control logic as taught by Lewis in the same rationale as explained in claim 1.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

"Method and System For Evaluating a Wireless Link" by Heath et, al. (U.S. Patent 6850498)

"Method and System For Adapting a Network Application Based on Classifying Types of Communication Links Using Fuzzy Logic" by Cheng et al. (U.S. Patent # 6766309)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry Zhu whose telephone number is (571) 2724237. The examiner can normally be reached on 8:30 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on (571) 272-3687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jerry Zhu
Examiner
Art Unit - 2121
2/16/2005

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